"Location advantage in end to end Telecom operation"

Cheriyan Oommen[1], Manoj Garg[2]

[1] Architect - Specialist, VirtusaPolaris, Hyderabad

[2] Architect - Technology, VirtusaPolaris, United Kingdom

115, Nanakramguda, Serilingampally, Ranga Reddy District, Hyderabad – 500032

Abstract:

Telecom end to end (e2e) operation includes three major processes. They are Concept to Market (C2M), Lead to Cash/Customer (L2C) and Trouble to Resolve (T2R). This paper describes about these three processes and how Geographical Information System (GIS) involves and leverages these processes in a cost effective, easy and intelligent way. It also mentions on how the organization is able to reap tangible business results out of it.

The journey starts with C2M, which includes various market analysis and identifying the potential area/audience for the service. In this phase, proposals will be made according to the findings from market research. GIS helps in accurate analysis according to the geographic search. It adds more value to the analysis as any data without having location details is incomplete to execute.

Upon identifying the prospective area/customer, L2C becomes active. It is ideally converting the lead to customer who helps to generate cash for the organization. In this phase, GIS helps to determine whether the requirement can be met with existing infrastructure or not and determines which product/service can be best suitable for a given customer/area. It also helps to assign a lead time and make the requirement to customer by augmenting the existing connectivity/infrastructure.

On establishing relationship with customer, T2R to take care of its day2day activities, technical support and proactive value additions. As far as trouble shooting is concerned, details with geographical location will add value to the information and will reduce downtime by helping the engineer/technician to reach the fault location easily.

Use of GIS in every phase will strengthen analytical, planning & troubleshooting activities. ESRI's functionalities help reducing turnaround time and improve accuracy of the analysis, which in turn generate more revenues to the organization.

About the Author:

Mr. Cheriyan Oommen   **Mr. Manoj Garg**

Cheriyan Oommen, a professional with 16 years of experience, is an Architect-Specialist at Virtusa, Hyderabad. He has experience of implementing GIS systems with a wide range of activities covering network inventory modelling, configuration, business analysis, E2E Design, consulting and training at major Telcos in India, Europe and Middle-East. He is a certified Trainer on Ericsson's Network Engineer™. He has presented papers in ESRI India UC 2013, 2014 & 2015. His paper in UC 2014 was awarded as the first runner up technical presentation.

Mail : cheriyano@virtusa.com Tel: +91 9959975065

Manoj Garg, a professional with 18 years of experience in GIS and Telco domain, is currently working for Virtusa as Functional Architect. He is of the expertise in implementing ENE (ESRI based) at various international clients including the biggest implementation at BT (recognized by ESRI in 2012 for having the largest connected network). His innovative yet pragmatic thoughts with both business and technical arena makes his involvement E2E from requirements to post implementation with end user focus. He has authored a paper in ESRI India UC 2015.

Mail : mgarg@virtusa.com Tel: +44 7786260927

Introduction

VirtusaPolaris is a global information technology services company providing IT consulting, technology, Banking and Financial Services (BFS) and outsourcing services. Using our enhanced global delivery model, innovative software platforming approach and industry expertise, we provide high-value IT services that enable our clients to enhance business performance, accelerate time-to-market, increase productivity and improve customer service. We serve Global 2000 companies and the leading software vendors in Banking & Financial Services, Insurance, Telecommunications, Technology and Media, Information & Education industries. We build and sustain application platforms for our clients that create competitive advantage. We are headquartered in USA and have offices and technology centers throughout the United States, Europe and Asia. VirtusaPolaris Positioned as a "Niche Player" in 2015 Gartner Magic Quadrant for IT Services for Communications Service Providers, Worldwide. VirtusaPolaris recognized by HfS Research as a High Performer in the IoT Services Market in 2016.

End to end telecom operation

"Location matters", "Location is the key", we keep hearing these phrases in our daily life without realizing yes, geo-location matters in every aspect even more than it ever used to. Whether it's starting a small 'fish n chip' store to a large supermarket or locating ATM or even Telecom operation, location is everywhere.

Even though geography is becoming core part of every business, it is more closely tied in Telco. Services are being delivered in a service area; infrastructure that delivers services is directly linked with the location of customer and serving equipment.

Fig 1: GIS view of network analysis (Indicative)

When it comes to investment or deploying the network capable of meeting at least X number of year demand, it's again location where business will expand /new business setup/ residential development etc. Location combined with spatial relationship aspect becomes easy to predict the network need in future for effective and systematic investment. Considering IOT and 5G on the roadmap, location of tower, equipments are even more paramount. If location aspect is taken away, data analysis will lose its meaning. Location provides that context to make analysis more meaningful and leading to intelligent and timely action.

In every phase of Telco network, location has become the major driving factor of operation. Whether it's marketing about the product availability or promises made for the speed. Location of premise,
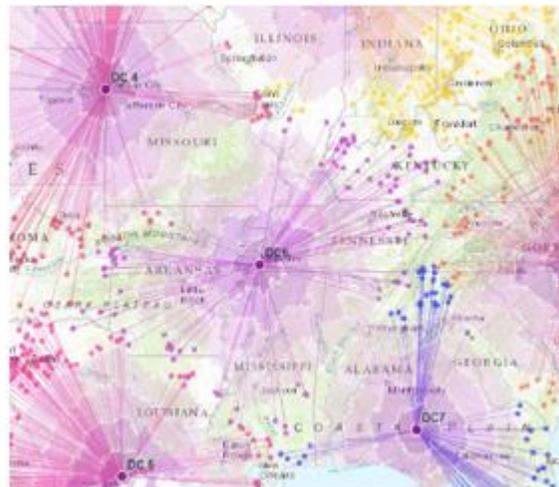
exchange, serving equipment matters especially when in technologies like FTTC (Fiber to the cabinet) speed starts to decrease with distance. G.Fast speed keeps decreasing as you go away from the cabinet. That is location of cabinet vs. being served premises matters. If G.Fast cabinet is placed at one end and the houses being served is on the other end. How can even promise the same speed to everyone? It's no more just order placement based on general product availability in one area. If location of cabinet and customer is known, upfront customer can be told what speed they can have

Fig 2: Fibre to the Home network elements (Indicative)

on a given product avoiding ambiguity later. This helps in winning the trust of customer. Network topology and product options can be upfront planned by taking advantage of location analysis and aim to market and rollout can be done giving competitive advantage in the market.

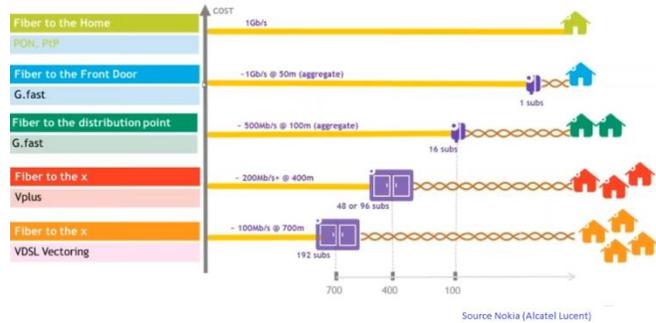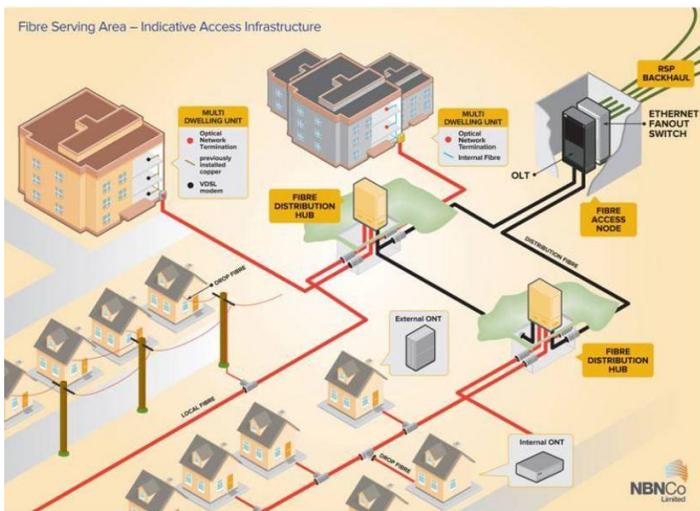*Fig 3: Telecom Network Distribution (Indicative)*

Geospatial system helps in designing and planning the network including the build and activation. Since so many decisions are dependent on the data in the system, geographic location matters a lot. Inventory Management System supports inventory whether outside plant or inside plant, connectivity, rack space management, fault trace etc. on real world co-ordinates. It helps the engineers to plan, design and update in efficient and cost effective manner in E2E. Geo-spatial inventory management complemented with GIS

operations like location is proving an asset to faster deployment, reducing lead to cash

and trouble to resolve time and target the specific customer segment by analyzing the behavior pattern of network and customer.

Need for E2E Network Inventory System

End to end telecom operation consists of various stages namely Concept to Market (C2M), Lead to Cash (L2C) and Trouble to Resolve (T2R). In telecom, wireline and wireless facilities and devices are required to be managed in a system which has GIS capabilities. C2M is Concept to Market. In this phase, strategic decisions and analysis are done on how to present to customer
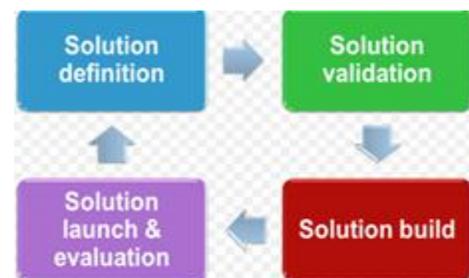

Fig 4: Telecom e2e Concept (Indicative)

and comparison between other operators and how to be competitive etc. It also includes the preparation of various kinds of offers/services at the best market price.
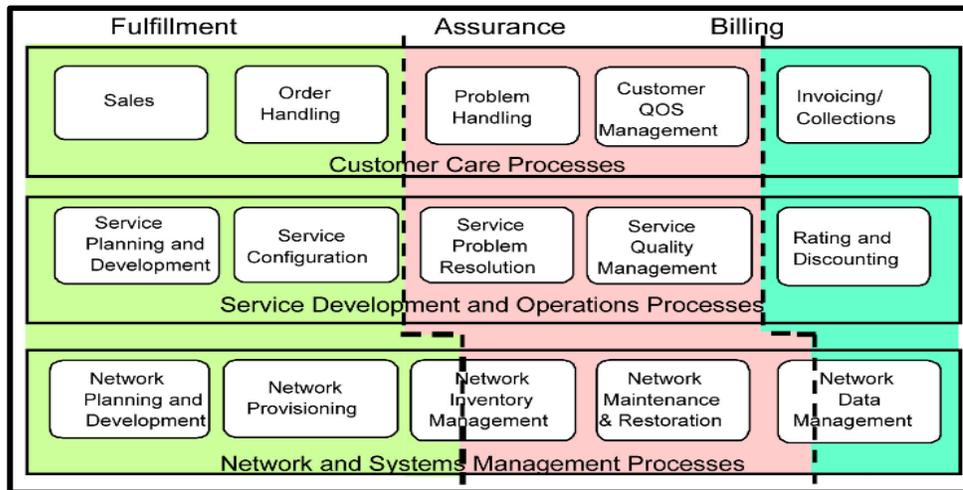

Fig 5: Telecom Industry Dynamics (Indicative)

In Lead to Cash (L2C) or Order to Activation (O2A), the concentration is on how to convert the lead to a valuable customer at the earliest. In this process, location based analysis and decision making will take it forward much faster and efficiently. Lead gets converted to a customer in the systematic manner compared to without using geographical information system. Order to activation journey is effectively supported by GIS. The value addition by GIS is many. By providing the exact location information, it increases the momentum of the activity as area surrounding information can be obtained by using the location details. It also helps to perform and manage the activity with increased accuracy and efficiency.

Trouble to Resolve (T2R) deals with customer on various issues and augmentations. In this phase, details with geographical location will add value to the process and will reduce downtime by helping the engineer/technician to reach the fault location easily. Conventional database doesn't have geographic system or view associated to addresses. Incorporating and implementing location based system in the inventory data, it becomes easier for the entire trouble shooting team to execute the rectification/augmentation activity seamlessly.

For a field engineer, who is onsite to provide new connections, it matters the location of nearest equipment with capacity, whether the customer can be severed from the given equipment or not. Engineer can be provided with a real time spatial view of network suggesting the best possible serving equipment location. Customer can be informed in real time

Fig 6: Equipment location in GIS (Indicative)

when engineer is expected to visit and even send reminder when engineer is about to reach. Engineer can know the location of other engineer and coordinate better.
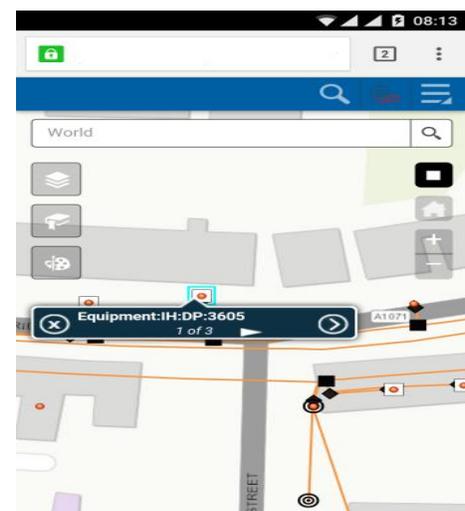
With the geo-location aspect by analyzing the data collected, we can predict which equipment or part of network is aging or will be affected by severe weather condition to enable proactive monitoring. Also how and what area will be impacted, will provide more correct impact assessment. It also helps the team to identify the location, check the historical surroundings data and carry the required toolset and materials for the activity. This also helps the analysts to perform any required proactive/preventive maintenance at the specified location.

Fig 7: BSS and OSS network (Indicative)

Where traffic management rules, permit to dig etc. are to be followed, geo-location can upfront help in making more reliable decision rather than based on physical survey result. Live traffic data can be fed to GIS system to schedule the work in non-peak traffic hours to avoid disruption. Alternate route can be planned if area is too much of disruption prone.

Network management is classified into Business Support system (BSS) and Operation support system (OSS). In a nutshell, BSS is customer facing and OSS is network facing. It is important to manage the physical and logical inventories in effective and intelligent manner with geographical reference. Physical inventories include all assets and logical inventories include all customer fulfillment etc.

Traditional paper maps or storing the spatial data, which are not true to scale, lack of updated network data and customer locations and isolated GIS system won't help in this era of technologies advancement where knowing the correct location in near real time is the key to business. With the integration of GIS system with OSS/BSS in Telco Operation helps in achieving end-to-end automation of network management, network discovery, and quick response to outage or network fault. This helps in winning customers which will result in increased revenue and better customer satisfaction.

ESRI, the leading GIS software/service provider and trend setter offer capabilities for the complete GIS solutions for Telco Management. Be it analysis, network planning/update, empowering surveyor with the GIS application, data collector app for data collection, real time location mapping of infrastructure, route management, near real time network coverage visualization etc. ESRI's SDK/API provide capabilities to integrate GIS system with OSS/BSS as well as to customize/extend in built functionalities as desired by customers. ESRI's options like thematic mapping, graduated colors etc. helps the analysts to perform their activity without any customizations as these are readily available in the core product. Many service providers around the world are using these in-built capabilities of ESRI technology.

Conclusion

1. It is very important for any telecom service provider to create and manage their e2e network inventory embedded with GIS for seamless maintenance and augmentation of network.

2. Having an E2E system supported by GIS helps to minimize the effort and improves the T2R activity. This helps the organization to achieve more revenue at a reduced operating cost.

3. Use of GIS in E2E journey helps in scaling up the network and customer base in terms of augmentation/expansion at an increased momentum. The scalability of the system is to be made at minimal effort and cost in order to include any future expansions.

4. Winning customer with the organized goal using the lead management system will multiply results with the help of GIS.

5. ESRI's proven and user friendly functionalities help in analysis, survey and required customizations and integrations.

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